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ABSTRACT

METRO II, a regional metropolitan computer consortium, was developed to provide for joint computer services in five school districts with a combined population of 150,000 students. To effect this consortium approach, each of the districts, already with sophisticated EDP, must analyze current systems and project its anticipated needs to fit the new, regional METRO II effort. In turn METRO II must align with the statewide MECC (Minnesota Educational Computing Consortium) design. There is obvious difficulty solving and resolving problems with equipment, software, and people. However, changing technologies and more sophisticated MIS would seem to preclude the founding dictum: equal or better service for no greater cost. Greater cost may be justified if more cost-effective utilization of computerized MIS occurs in administrative decision-making and services are enhanced. This appears to be happening with METRO II. (Author/VT)

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DEVELOPING A METRO COMPUTER CONSORTIUM: PROMISES AND PROBLEMS

D. Thomas King

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DEVELOPING A METRO COMPUTER CONSORTIUM: PROMISES AND PROBLEMS

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ABSTRACT: Providing for joint computer services in five school districts with a combined population of 150,000 students is a demanding, challenging problem. To effect this consortium approach, each of the five Twin City area districts, already with sophisticated EDP, must analyze current systems and project its anticipated needs to fit the new, regional METRO II effort. In turn Metro II must align with the statewide MECC (Minnesota Educational Computing Consortium) design. Problems with equipment, software and people can be solved and resolved, but not without some obvious difficulty. However, changing technologies and more sophisticated MIS would seem to preclude the founding dictum: equal or better service for no greater cost. Greater cost may be justified if more cost-effective utilization of computerized MIS occurs in administrative decision-making and services are enhanced. This appears to be happening with Metro II.

Metro-II, a regional, metropolitan computer consortium, began in 1972 as a joint powers agreement resulting form some enabling state legislation in Minnesota. Aware of the considerable tax dollars being expended for hardware and diverse computer systems being developed by various state and local governments and agencies, the Minnesota legislature passed a law which, in effect, consolidated educational computer services at all levels: elementary, secondary, vocational (ESV), state college system and the university. To appreciate the extent of the problem to be solved, one must realize that just prior to the consolidating legislation, dozens of computers, software systems, applications and reporting systems were operational with a multitude of applications. Uses ranged from instruction (CAI and CMI) and pure research to a wide range of administrative applications.

Computing machines ranged in type from analog to digital, in size from the desk top to special purpose, and on to large, complex timesharing systems. Informational and organizational reports were generated internally and externally for all these educational systems. Operating systems were revised and expanded frequently. Computing people in education were, in effect, mass producing the invention of the wheel. Developmental costs were incurred by school districts for producing essentially identical student systems, for creating and maintaining equivalent instructional program libraries and a host of other essentially isomorphic systems. For example, CAI libraries had near identical versions of arithmetic drill and practice as well as the latest updated version of Star Trek incorporating Supreme Grand Master attack strategies. Where did it all lead? We found increasingly complex systems and machines, in their replication, costing the taxpayer exponentially greater dollars. Probably for the wrong reasons and a lot later than it should have occurred, legislators decided to put on the "disk brakes"!

Actually legislators, who in the final analysis had to approve funds for much of the statewide computing operation, at least indriectly, were beginning to feel the pinch. More directly, they felt, and rightly so, the need for a more comprehensive, uniform information reporting system. While many educational enrollments declined, requested budgets increased. Hence the need for better information for better decisions at all levels, including the legislators who must appropriate the dollars.

In 1970, the Governor's Task Force recommended comprehensive stateiwde information networks. In 1972, Metro-II was conceived. "Metro" identified the metropolitan nature of the involved school districts. The "II" referred to the fact that there existed already another metropolitan educational computer network--TIES. TIES had served a large number of Minnesota school districts, mostly metropolitan, with a total student population of nearly 250,000 students since 1960's. But the thrust of Metro II was different. These 5 districts with about 150,000 students, were already relatively sophisticated in their computer applications. St Paul had a rather comprehensive student and POBAS system. Minneapolis already was providing extensive CAI applications. Mounds View possessed an exemplary instructional management system. Robbinsdale had developed a comprehensive K-12 student system incor-

porating, academic, health, transcript and extensive extra-curricular information. District 916, clearly, was in to extensive vocational applications in EDP.

To make such districts fit consortium-wise from an MIS viewpoint, perhaps almost seems imMIScible. But to the chargin of the "nay-sayers" and to the credit of the "can-doers", it appears that it will indeed function and, eventually, function most effectively.

Using a systems approach adopted by the State of Minnesota called PRIDE, each of the five districts first listed, in some detail, all present applications as well as future computer directions. Considerable man-hours were expended during this phase documenting current systems operations, meeting jointly to discuss related problems and enlisting positive support from staff. Many feared or opposed the regional consortium approach during this period, adopting a "head-in-the-sand" approach: if we don't look, maybe it will go away! Of course, this strategy seldom works. It only makes one more vulnerable to attack from the posterior.

After considerable stressing and straining a complete list of "needed-nows" and "needed-laters" was produced by each district. The systems consultants involved, although generally most helpful, somehow managed to make the matters worse by keypunching this comprehensive list of needs and then computer-printing it for return for check and sign-off. However, they neglected to order or identify the needs beyond a Watsonian elementary manner, and each district searched through forty pages of randomized documented needs analysis to see if their artifacts were earthed somewhere.

Metro-II, in late 1975, began to feel the positive effects of leadership when its new Executive Director was named. Not long afterward, MECC, the parent statewide organization hired a full time Executive Director also. Although MECC's chief concern at the time was taming a Univac 1110 to provide CAI services, the addition of stable, responsible leadership there had a positive effect on all cooperative computing services.

Each district currently is making satisfactory progress toward completing various systems phases: personnel-payroll and student are progressing most rapidly. Financial and instructional management also are moving toward time-line phases. Greater difficulty has been encountered in the so-called Facilities-Other area: one man's mis-

cellany is another man's mission. For example: while busing may be exceedingly complex & horrendous in one district, in another, the regularity of streets, and consistency of enrollment policies beget total computer solution. In any event it is expected and hoped that by 1978, designing, developing, testing, retesting, piloting and parallel operation will cease and Metro II will be ready to go, fully operational.

The presently-adopted computer configuration calls for a central, host computer site housing a Burroughs 6700, with 5 satellite operations (B 1700), one in each of the five districts. Fully converting each of the present non-Burrough's users to the new systems will be a problem located below the water-line of the iceberg. For the largest part of the conversion problem would seem to be the retraining and re-education effort: all the users--and particularly the non-technical users. Each district has clerks and aides, secretaries, teachers, counselors, psychologists, researchers, principals, district office personnel, school boards and the public--who, in varying degrees, are producers and consumers of computerized information. All are involved with the legitimate, computerized need-to-know. The consortium approach will produce different effects for all those involved.

To provide an example of just part of the problem for one of the users consider some of the first phase requirements as submitted by the districts shown in Figure 1.

Figure 1

METRO-II NEEDS ANALYSIS

SCHEDULING & MARK REPORTING

Section I

A. SCHEDULING

1. Provide capability of scheduling elementary schools.
2. Provide for scheduling students district-wide, e.g., scheduling of classes outside of home school.
3. Provide capability of registering and scheduling students in Community schools.
4. Provide that student request file and master schedule be on-line for update processing.
5. Provide capability to schedule on demand any number of students, even after the bulk of students have been scheduled.
6. Provide capability of scheduling on-line on demand during prime time.
7. Provide capability of on-line course tally, matrix and segment matrix (one course against all other courses).
8. Provide capability of on-line independent study tally (open mod availability).
9. Provide capability to edit current courses, requests and credits earned against past course history and district requirements.
10. Provide capability of purging student data base to provide user with tallies of students not having completed specified required courses to assist in teacher staffing and master schedule building.
11. Provide master schedule builder.
12. Provide capability to integrate master schedules for diverse programs (e.g., learning center, individual schools, evening high school).
13. Provide capability of scheduling a student's courses based on prerequisites within the school year, i.e., schedule Math I before Math II.

B. MARK REPORTING

1. Provide capability of grade reporting for modular programmed classes with 1 grade and attendance per subject.
2. Provide capability to print assessment and evaluation statement type elementary report card from codes maintained on the data base.
3. Provide capability of having teacher comments on the grade reports and additional grading methods.
4. Provide capability of recording and reporting community school attendance, grade reporting, and credits earned.
5. Provide capability for city wide mark reporting students in more than 1 building.
6. Provide capability of each district using its own type of grade reporting format, forms, and notations.
7. Provide capability of updating courses and grades on-line during report card cycle.

CENSUS & TRANSPORTATION

Section II

A. CENSUS

1. Provide capability of maintaining student records via a family number and generating complete family lists.
2. Provide on-line capability to call for census enumerator forms printed for selected census addresses.
3. Provide capability of preparing statistical reports by family, including preschool students.
4. Provide capability of having additional statistical correlations.
5. Provide capability of reporting and recording door to door census, retaining records thru age 21.
6. Provide capability of merging school census with government census.

B. TRANSPORTATION

1. Provide ability to prepare statistical reports of pupils by census tract, by census block tract, by school, etc.
2. Provide capability of maintaining, on-line, a bus scheduling and routing subsystem including distance matrices.
3. Provide capability of maintaining attendance and participation records for transportation.
4. Provide capability of using street intersection nodes in transportation route scheduling.
5. Provide capability to maintain on-line for each census address the following:
   a. kindergarten, elementary, jr. high and sr. high school assignment codes along with distance from portal to portal.
   b. transportation eligibility and state aid eligibility codes.
6. Provide ability to identify transportation eligibility and information for various courses and programs other than normal school program (e.g., learning centers, special courses in other schools, ...).

STUDENT & ATTENDANCE

Section III

A. GENERAL

1. Generate student transcript (on demand) at school level.
2. Provide capability to maintain both community, career and adult education records.
3. Provide capability to integrate all data systems provided by MECC (both instructional and administrative).
4. Provide functional editing and updating system-on-line for entire data base.
5. Enhance capability of assigning students for the next year by computer.
6. Provide capability of surveying partens by use of census records.

B. STUDENT

1. Provide free lunch eligibility lists, reports, ID cards and mailing information.
2. Provide capability to identify AFDC and Title-I and provide target area identification.
3. Provide capability of merging tuition reports and records with the student information system.
4. Utilize state ward number (G number) for identification and processing purposes for Special Services Department.

C. ATTENDANCE

1. Provide the capability of daily attendance reporting for as many calendar report periods as necessary. Include enrollment data for the reporting period. Generate school absentee lists and summary data at the end of each term and school year.
2. Provide capability of keeping records of attendance and participation in all special programs.

D. HISTORY

1. Maintain student records on students from date of first enrollment (grades, attendance, schedule of classes, programs, etc.).
2. Generate cumulative records and transcript of credits.
3. Generate master roster of students from past records to verify various aspects of requested information.

E. SPECIAL PROGRAMS

1. Maintain Common Program Directory Information (Special Education, Federal Projects, E.S.A.A., Right to Read, etc.).
2. Provide capability of generation of the federal Title-I comparability report (combine student, finance, and personnel information).

F. GUIDANCE

1. Provide guidance information for occupational plans, information to be tied to student's record merging student data with counseling package. (i.e., occupational plans and goals).
2. Provide the capability of a computerized vocational information system (like CVIS).

G. TEST REPORTING

1. Provide ability to scan, score, analyze and prepare reports for teacher made tests, standardized tests, computer achievement monitored tests, curriculum assessment tests, etc.
2. Provide ability to do correlations of various tests to one another.
3. Provide ability of progress monitoring of individual student on tests.
4. Provide capability of producing individual test skills profiles.
5. Provide capability of producing correlations between the grading system and testing system to include historical data.
6. Provide capability of norming all standardized tests including also criterion referencing.

H. RESEARCH

1. Prepare special transfer statistics.
2. Provide capability of using student files for needs assessment, sight count (suspensions, retentions, lunch program, graduate follow-up), and other surveys.
3. Must identify for research purposes, courses attempted but not completed from current and history data.
4. Provide a wide spectrum statistical package.

I. SUMMER SCHOOL

1. Provide capability of handling summer school - including registration, scheduling, mark reporting, attendance and transportation for elementary,secondary and special education programs.

CONCERNS

Section IV

The members of the METRO-II Needs Assessment Committee submitting their respective needs, for the statewide MIS, have also included a number of potential problems and needs. The committee feels that these concerns should be addressed by appropriate MECC personnel. These areas of concern deal with hardware capability, data volume, district resident hardware, etc. The following list identifies the concerns which were included in the MIS needs submittal to MECC:

1. Capability for minimum turnaround of reports and data 48 hours or less.
2. Capability for back up runs on emergency basis if computer down.
3. Ability to deliver forms on a daily basis to schools.
4. Problem with all schools opening same time and data volume.
5. Scanners needed in district for edit capability.
6. Ability to provide COM services.
7. Ability to convert past microfilm records, not on computer, to on-line terminal.
8. Terminal update (file maintenance) at school and district office level. Require both CRT, card readers and printers for user.
9. Capability of compiling and executing Fortran IV for a variety of statistical reports.
10. Must have capability to handle all aspects of non-public school processing.
11. Provision for CAI-oriented program which provides explanation of data base and reports available to district personnel.
12. Capability of producing any government report.
13. On-line service request plus status of request.

Subsequent phases in development call for refinement of these needs into more precise language, and the detailed systems analysis necessary to begin the preparation for the massive programming effort. Many of the Metro II districts already are planning for telecommunications systems. This lends another dimension to the system but also more problems. In St. Paul, we currently are utilizing two CRTs in the Student Accounting Office primarily for file inquiry. Creating and modifying student records is planned for fall, 1976. Although the district is faced with declining enrollments and, therefore, dollars, it is hoped that selected schools will be utilizing telecommunications within a few years. Data can be considered truly accurate only when those who provide that data, in this case the schools, use it. Instantaneous access to and correction of student files promotes overall usage and, hence, accuracy. and of course, in the student area, where numerous internal reports are prepared to assist in decision-making and external reports are made for various local, state and federal aids and reimbursements, accurate data is critical. Since Metro II is funded by member districts as well as state contribution, the consortium has a stake in this vital area as well. Not only do district payrolls have to be on time and correct, so also do the membership foundation aid reports.

Another concern is data security. While most districts now have their own approaches to security problems, security becomes somewhat more critical in a consortium. In Minnesota, we must comply not only with a federal law on data privacy, but we are also subject to a comprehensive state law which covers all records on individuals maintained by local governments. This includes school districts. Thus, each school district has set up regulations and procedures dealing with the privacy aspects of data for their own districts; some have instigated security measures as well. In St. Paul, magnetic cards are required

to enter the data processing areas. We have also developed forms, brochures and procedures to comply with the privacy laws in data collection and reporting. The present CRTs in use in our district require sophisticated identification procedures before files may be accessed. Although the temptation to illegally access files might exist in the educational sector, there does not seem to exist the more compelling security paranoias as are prevalent in the private sector. School districts do need to establish proper security measures and procedures dealing with proper collection, maintenance and release of information. But, overly elaborate and excessively costly security procedures probably are not essential in the educational domain. Our problems generally arise more from inattention than intent, carelessness than calculated plotting. In any event, Metro II will provide for data security within and between districts. It is hoped that, as an agency of state government, Metro II will assist in bringing about more consistent procedures dealing with the collecting and reporting of information. While the proverbial song-sheets do not have to be identical, they should be similar enough to provide harmony instead of cacophony. Inter-district transfer of student records, for example, should be a simple consistent procedure to insure the smooth flow of the educational process when a student transfers from one school district to another.

A related concern is the reporting of information to the state. Metro II has taken an active role in cooperation with our State Department of Education to revise and reform, as much as possible, antiquated, pre-computer reporting systems. For example, presently, all reports submitted to the state are laboriously hand-transcribed from computer sheets to state forms. Since those state forms are essentially pre-deluvian (many not revised in several decades), much of the data needs to be massaged before it can be transcribed. Why not one reel of tape from us to them instead

of reams of paper? Or, if school districts now, finally, begin to utilize the telecommunications technology widely adopted in the private sector a decade ago, there are even more efficient methods. Another problem: some years ago, state aids in Minnesota were based on Average Daily Attendance. Now those aids are determined by Average Daily Membership. Yet, school districts still are required to complete voluminous ADA figures for the annual state report. We have estimated that, in the St. Paul Schools alone, the collection, maintenance and reporting of this data costs nearly $100,000 per year. Assuming that someone, somewhere in a state cubicle reviews these esoteric figures accurate to three decimal places, is it worth the cost? Metro II is helping to get an answer to this question.

While much work has been accomplished, much yet remains to be done. Timelines call for piloting and parallel operations next year, conversion in two years. Dollars are needed; support is needed, much hard work is needed. If these essential components can be maintained, Metro II can become a functioning, effective computer services consortium. We would hope that, in a synergistic sense, the combination of our five school districts will be whole greater than the sum of the parts. If so, problems will be solved and promises will be kept. Good decisions require good information. Making such decisions is a promise to ourselves that we must keep. In that sense, problems are, instead, a true challenge to us all.